

MYTHOLOGICAL EVIDENCE FOR ANCIENT OBSERVATIONS OF VARIABLE STARS

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Abstract

I suggest that the variability of Algol was known in pre-classical Greece, and that knowledge of its period is reflected in the myth of Perseus. Moreover, knowledge of the variability of Algol, Mira, delta Cephei, and gamma Cassiopeiae accounts for all their parent constellations being associated in the same myth as antagonists of Perseus. Finally, I propose alternative interpretations of the same constellations which show their influence upon classical myths.

1. Introduction

The known history of variable stars begins with David Fabricius' 1596 observations of the appearance and disappearance of omicron Ceti (Mira). The eclipsing variable star Algol was first noted by Gemiani Montanari in 1667, but its period of 2.867 days was not measured until the 1783 work of Nathaniel Pigott, John Goodricke, and Johann Georg Palitzsch (Beekman 1990; Hoskin 1979).

There has long been suspicion that knowledge of variable stars extends much farther back in time. The idea that the variability of Algol or Mira was known in ancient times has been suggested by readings of ancient Babylonian (Schaumberger 1935) and Chinese (Sahade and Wood 1978; Schafer 1977) texts. More commonly, the suggestion is made that the names applied to Algol—"Demon's Head," "Head of the Gorgon," "Lilith," "Satan," or the "Piled-up Corpses"—have a vaguely evil ring to them, which must suggest ancient knowledge of peculiar properties (Allen 1963). More suggestive of ancient knowledge of Algol's variability is its rarely-cited Hindu name, *Mayavati*, meaning "The Changeful" (Mukerji 1905; Budding 1988).

I believe that a much better case for ancient Greek knowledge of variable stars can be made upon the basis of Greek mythology, and that this evidence is not at all vague. Elements of the story of Perseus were inspired, I suggest, by the behavior of Algol and other variable stars in that region. A similar suggestion was made a few years ago (Lettvin 1979), but my interpretation differs significantly from that one.

2. The myth of Perseus, the Gorgon, and Andromeda

The fullest and arguably the best account of the myth of Perseus is that of Apollodorus (Frazer 1921). Perseus, son of Zeus and Danae, was sent by the tyrant Polydectes to obtain the head of the Gorgon. He first visited the Graeae, sisters of the Gorgons. These had the form of old women, and had only one eye that they shared in common. Perseus intercepted the eye as they passed it from hand to hand, and promised to return it if they gave him directions. They did so, but according to some accounts, Perseus threw the eye into Lake Tritonis in Africa, allowing him to escape.

He flew on to the island of the Gorgons and found them asleep when he arrived. Two of them, Stheno and Euryale, were immortal, but the third, Medusa, was not. Perseus struck off Medusa's head and stuck it in his bag. From the severed neck sprang the

winged horse Pegasus and the warrior Chrysaor, Medusa's children by Poseidon. The noise roused the other Gorgons, but Perseus was able to escape.

As he returned home, he passed over Ethiopia, and saw Princess Andromeda chained to a rock as sacrifice to Cetus, the sea-monster. Perseus went to Andromeda's parents, King Cepheus and Queen Cassiopeia of Ethiopia, and offered to save Andromeda, provided she was given to him in marriage. They agreed, and he rescued her and slew Cetus, but Cepheus and Cassiopeia later plotted against Perseus, and he turned them to stone with the Gorgon's head. He then returned to his home in Seriphus and dealt similarly with King Polydectes.

3. Interpretations: Algol

The constellation of Perseus has been associated with the mythological character of that name at least since the fifth century B.C.E. (Hammond and Scullard 1972). Later illustrations generally show Algol forming one of the Gorgon's eyes, but Roman and Arab authors call the star the *head* or *face* of the Gorgon. A more reasonable interpretation of the periodic fading of Algol is that it represents Perseus cutting off Medusa's head and placing it in his magic bag.

Algol B eclipses Algol A approximately every third day. Surely this is the explanation of the fact that there are three Gorgon sisters, and why only Medusa is mortal. The two days during which Algol is *not* eclipsed represent the two immortal sisters, Stheno and Euryale. Medusa is the third day, during which the star is eclipsed, and the Gorgon "loses her head."

There is another way that the eclipsing of Algol can be interpreted within the same myth. It has been observed that the three Graeae are virtual doubles of the Gorgons. They are both sets of three sisters, and they share the same parents. I suggest that they, rather than the Gorgons, are the actual monsters from a parallel version of the myth, in which the task set to Perseus was to steal the eye of the Graeae. The fading of Algol in this case represents Perseus intercepting the eye (Algol) as it is passed from one sister to another.

There is an interesting corollary to this interpretation. The spectacular Perseid meteor shower every mid-August appears to originate from the arm of the constellation of Perseus. It is very easy to see in the display Perseus hurling the eye of the Graeae into Lake Tritonis.

4. Interpretations: the surrounding sky

It is peculiar, as Goold noted (Manilius 1977), that the constellations representing characters in the myth of Perseus and Andromeda are grouped so close together in the sky (Figure 1). Most of these constellations harbor naked-eye variable stars. Three of them are so noticeable that they have given the names to their types. Algol, the pre-eminent example of eclipsing variables, has already been mentioned, as has Mira (omicron Ceti), the first historical variable star to be officially discovered.

Goodricke, co-discoverer of Algol, also discovered delta Cephei, the prototype for Cepheid variables. One must also note that gamma Cassiopeiae, the center star of the "W" of Cassiopeia, is an irregular variable star which varies between 1.6 and 3.1. There are thus naked-eye variable stars in the constellations of Cetus, Cepheus, and Cassiopeia, besides Algol in Perseus. These are all constellations representing Perseus' enemies in the myth. (In addition, Cetus is the mother of both the Gorgons and the Graeae.)

Evidence of this sort can never be certain, but I maintain that this set of coincidences strongly suggests that the ancient myth-makers and proto-astronomers knew of the variability of Algol, Mira, delta Cephei, and gamma Cassiopeiae, and on this basis associated their constellations together in a common myth.

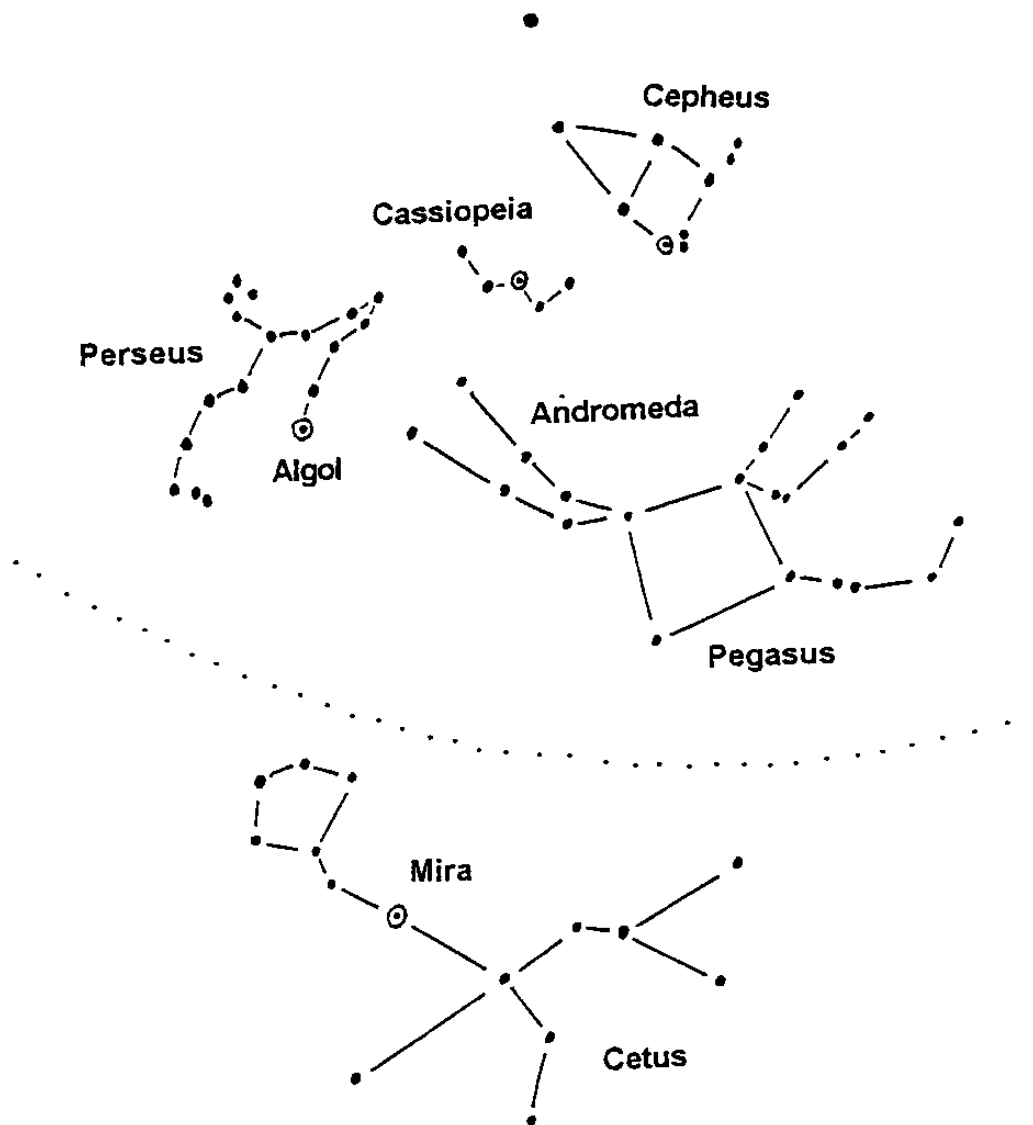


Figure 1. The Perseid constellations.

There are two other classical Greek myths which may easily be associated with the same constellations. Both of these myths are, coincidentally, related by Apollodorus as well. The story of Hercules and Hesione is so similar to that of Perseus and Andromeda that it almost amounts to a classical case of plagiarism. Graves (1955) and Frazer (1921), among others, suggest that both stories derive from the same source of inspiration (although they do not mention variable stars, of course).

The myth of Bellerophon involves another hero who defeats a monster (the Chimaera) with help from Athena, marries a princess, and is opposed by the king. In later legends (although not in Homer), he rides Pegasus, the winged horse.

The point here is that there are three myths which can be associated with the situation of Perseus, in which a hero at the center is surrounded by enemy-constellations containing variable stars. There are also constellations representing the princess-heroine and an associated horse.

There is also a fourth possible interpretation of part of this set of constellations. This interpretation explains one of the oldest and most peculiar images associated with the myth—the birth of Chrysaor and Pegasus from the neck of Medusa. That incident is first referred to in one of the most ancient Greek poems extant—Hesiod's *Theogony* (Evelyn-White 1964). Ancient artists have sometimes tried to portray this event, but the effect has always been bizarre.

The real meaning of this odd myth is apparent from the constellations of Perseus (with Medusa's head) and Pegasus. If we interpret Hesiod's words to mean that Pegasus and Chrysaor sprang from the stump of the neck that is attached to the head, rather than from the stump attached to the body, then the scene is pictured in that grouping of stars. The constellation of Perseus stands in for the person of Chrysaor, springing to the East. Pegasus, the winged horse, faces and springs to the West (Figure 2).

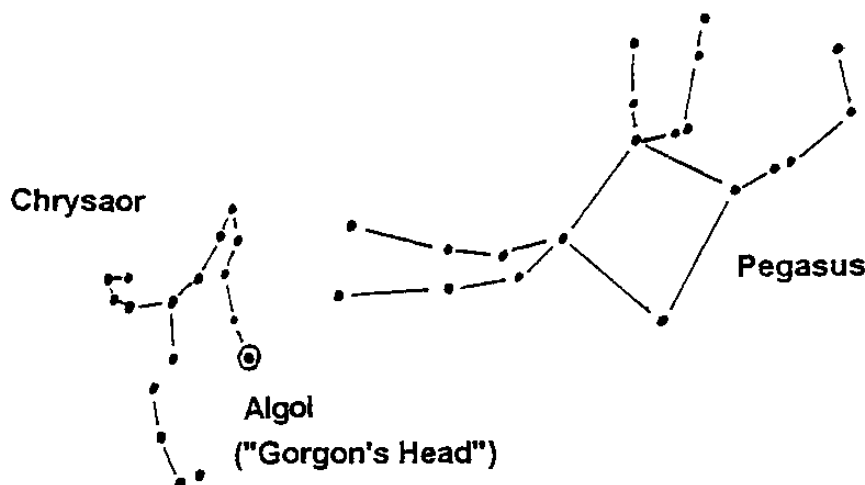


Figure 2. Interpretation of the birth of Chrysaor and Pegasus from the neck of Medusa.

5. Conclusions

The correlations between the variations of Algol and elements of the myth of Perseus and the Gorgon suggest ancient knowledge of that variability. The further association of surrounding constellations, which contain most of the naked-eye variable stars visible from Greece, with characters in the same myth, suggests that these variable stars were also known in pre-classical Greece, when the myths arose.

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